selecting a high acceleration voltage but the small-angle scatter at the openings in the grid cannot be reduced. This small-angle scatter can only be reduced by making [finer and finer-mesh] nets of finer mesh, [however] albeit at the expense of grid transparency. Beam divergence creates a larger beam cross-section at the location of the detector, which necessitates a large-area detector. This large-area detector has disadvantages: a high level of noise and the necessity of very good two-dimensional directional adjustment in order to keep the flight path differences well below one micrometer.

Please substitute for the paragraph beginning on page 2, line 27 the following:

For an optical system with two acceleration grids and one two-stage reflector with two grids, which each have to be transversed twice, there are already six grid passages. Even if the grids have a high level of transparency at 90%, which can only be achieved if the thickness of the grid wires is only about 5% of mesh size, total transparency is still only 48%. In addition there will be a [no longer negligible] non-negligible number of ions which are reflected by the grids and can be scattered back to the detector where they create background noise, which worsens the signal-to-noise ratio.

Please substitute for the paragraph beginning on page 3, line 11 the following:

All the mass spectrometers known [to date] for orthogonal injection, however, have the [basically] very disadvantageous grids (due to the band-shaped ion beam which does not permit spherical lenses), both in the pulser and in the reflector.

Please substitute for the paragraph beginning on page 3, line 19 the following:

Throughout this text, we shall use the following nomenclature:

1) the original flight direction of the orthogonally injected ions defines the x-direction,

2) the direction[, into] in which the ions are pulsed by the pulser[,] defines the y-direction,

3) the z-direction is defined to be perpendicular to the x- and y-direction.

A4 The three directions are orthogonal to each other; the y-direction is not completely identical with the flight path of the ions after being pulsed by the pulser.

Please substitute for the paragraph beginning on page 4, line 15 the following:

A5 Since the z-divergence of the ion beam leaving the pulser necessitates very wide slit diaphragms at the two-stage reflector, it is useful to install a cylindrical lens [here too] between the pulser and the reflector, making the ion beam narrower in the z-direction. The cylindrical lens can be a cylindrical Einzel lens. It is particularly advantageous to place the cylindrical lens close to the pulser and set it electrically so that an initial focusing in the z-direction is achieved between the pulser and the reflector. A focus line is formed, expanded linearly in the x-direction (almost perpendicular to the direction of flight) and located between the pulser and the reflector. This focus line is then focused, in the z-direction, onto the detector by the two-stage reflector. Another reason why installation of the cylindrical lens is particularly advantageous is that the ratio between deceleration field strength and reflection field strength in the reflector not only sets spatial z-focal length but also velocity focusing (and hence temporal focusing) at the detector, which takes absolute priority in achieving a high temporal resolution (and therefore mass resolving power). The cylindrical lens thus makes it possible to set the focusing length of the entire arrangement in the z-direction irrespective of velocity focusing.

Please substitute for the paragraph beginning on page 6, line 10 the following:

A6 Figure 3 shows [an also] a possible convolution of the band-shaped ion beam in the x-y plane. The designations are the same as in Figures 1 and 2.

Please substitute for the paragraph beginning on page 7, line 8 the following:

A7 The ions which have left the pulser now form a wide band, whereby ions of the same type [are always] form a linear segment in the x-direction flying nearly in the y-direction.